

DERWENT-ACC-NO: 2003-441297

DERWENT-WEEK: 200341

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TITLE: Manufacture of patterns on  
photomasks or reticles used  
for the fabrication of semiconductor  
devices e.g. MRAM or  
DRAM, uses elliptical shaped laser or  
electron beam to  
form the pattern

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PATENT-ASSIGNEE: CARPI E L [CARPI] , INFINEON TECHNOLOGIES  
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PRIORITY-DATA: 2001US-0032389 (October 26, 2001)

PATENT-FAMILY:

| PUB-NO              | PAGES       | PUB-DATE    | MAIN-IPC |
|---------------------|-------------|-------------|----------|
| ✓ US 20030082461 A1 |             | May 1, 2003 | N/A      |
| 000                 | G03F 009/00 |             |          |
| ✓ WO 2003036386 A2  |             | May 1, 2003 | E        |
| 019                 | G03F 001/14 |             |          |

DESIGNATED-STATES: CN JP KR AT BE BG CH CY CZ DE DK EE ES  
FI FR GB GR IE IT LU  
MC NL PT SE SK TR

APPLICATION-DATA:

| PUB-NO          | APPL-DESCRIPTOR  | APPL-NO |
|-----------------|------------------|---------|
| US20030082461A1 | N/A              |         |
| 2001US-0032389  | October 26, 2001 |         |
| WO2003036386A2  | N/A              |         |
| 2002WO-EP11951  | October 25, 2002 |         |

INT-CL (IPC): G03C005/00, G03F001/14 , G03F009/00

ABSTRACTED-PUB-NO: WO2003036386A

BASIC-ABSTRACT:

NOVELTY - Photomask manufacture method, includes a mask (316) with elliptical (34) or rounded features formed using an elliptical shaped laser on electron beam (350) to form a pattern including an oval or rounded feature on the mask. Portions of the oval or rounded stair shaped features on the mask are removed. The oval or rounded feature stair-shaped edges (344) are removed also with the energy beam. The mask is used to pattern a semiconductor wafer which comprises a magnetic random access memory (MRAM) or dynamic random access memory (DRAM) device.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for;

- (1) a method of fabricating a mask for patterning a semiconductor device,
- (2) a method of fabricating a semiconductor device,
- (3) a semiconductor device patterned using the above method,
- (4) and a method of patterning a semiconductor wafer.

USE - For use in obtaining elliptical and rounded shapes using laser/electron beam shaping

ADVANTAGE - Provides a method of creating oval and rounded features on a semiconductor device mask that are absent the stair step edges resulting from laser/electron beam patterning using a beam having a circular cross section. Memory devices such as MRAM and DRAM devices particularly benefit from the ability to create elliptical shapes and patterns, maximizing memory cell performance. Furthermore, smoothing edges of oval and

rounded features with an  
elliptical-shaped laser-electron beam is faster, requires a  
lower power  
density, and patterns a larger surface area than using a  
circular cross  
sectional energy-beam, and in prior processes.

DESCRIPTION OF DRAWING(S) - The drawing figure shows an  
elliptical  
laser/electron beam being used in the mask process.

Mask 316

Elliptical or rounded features 340

Stair shaped edges 344

Elliptical shaped laser on electron beam 350

CHOSEN-DRAWING: Dwg.4/6

TITLE-TERMS: MANUFACTURE PATTERN PHOTOMASK RETICLE  
FABRICATE SEMICONDUCTOR  
DEVICE DRAM ELLIPSE SHAPE LASER ELECTRON BEAM  
FORM PATTERN

DERWENT-CLASS: P83 P84 U11 U14

EPI-CODES: U11-C04A; U11-C04D; U11-C04E1; U11-C04E2;  
U11-C04F1; U11-C04F2;  
U14-A03B4; U14-A04A;

SECONDARY-ACC-NO:

Non-CPI Secondary Accession Numbers: N2003-352291